

ou não da presença destas plantas invasoras. A avaliação teve como objetivo analisar a eficiência do sistema de aplicação de herbicida automatizado, utilizando-se o sensor Weedit para identificação das plantas daninhas. Realizou-se um estudo de tempos e movimentos para a determinação dos rendimentos operacionais e, para avaliação da qualidade e do controle das ervas daninhas, foram instaladas aleatoriamente parcelas nos talhões onde houve a aplicação automatizada. Esta aplicação, resultou em uma redução de consumo de herbicida e de água em 53 e 51%, respectivamente quando comparado com a aplicação sem o uso do sensor. Em relação ao rendimento operacional, o conjunto mecânico apresentou uma disponibilidade mecânica de 91% e capacidade de campo efetiva de 1,3 ha h⁻¹. Desta forma, concluiu-se que o uso de sensores pode contribuir para o uso mais sustentável de produtos químicos e água.

The importance of genotyping to specific site in precision silviculture

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The term precision silviculture can mean the selection of individuals of a species in a natural population with characteristics suitable for a particular purpose of use. As each individual of the population occupies a specific site, in addition to the soil variables, it is fundamental to identify genotype environment interactions. In this way we are conducting experiments of precision silviculture in specific site in Morretes Paraná State with tree species, *Calophyllum brasiliensis*, *Liquidambar styraciflua* and *Bactris gasipae*, to test influence of specific site on development of plants and future seed production. The variables evaluated in each specific site of each species is soil fertility, soil structure, soil water adsorption curve, resistance of soil penetration, depth of the water table, soil density, diameter at breast height and total height of plants. The same provenance of *Calophyllum brasiliensis* and same clones of *Liquidambar styraciflua* and *Bactris gasipae*. The experimental design is randomized blocks in single three plot with 30 replications / specific sites of each species. The genotyping of each tree of each specific site, combined with variables of soil and climate conditions become possible a much more completely inferences of adequate specific site to each studied species.

Different planting design with the same density yields no difference on the growth of conifer plantations in Sweden

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Traditionally, in Swedish forestry, square planting design in a 2 x 2 m arrangement is used for plantation as it is claimed to maximize productivity. With this study based on long-term trials established in mid-1980s, we aimed to test if different planting designs (from square to different rectangular spacings) exert any effect on the growth of three coniferous forest in Sweden: Scots Pine, Lodgepole Pine and Norway Spruce. In these trials, an initial planting density of 2500 seedlings/ha was established using five different planting designs (0.8x5, 2x2, 1x4, 1.33x3 and 1.46x1.46x4 m). DBH, height of the sample trees and damage was recorded from each planting design. Our results show that the volume production, diameter distribution, spatial heterogeneity and damage were not significantly affected by the different spatial designs. This information greatly enhances our knowledge of planted forests, suggesting more flexibility for spatial layout of plantations and consequently for the machinery operations than previously thought when a quadratic planting design was preferred.

A loblolly pine mid-rotation fertilization response model, accounting for response uncertainty

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Mid-rotation fertilization presents an opportunity to increase the economic return of commercial plantation forests. Since the 1990s, a series of loblolly pine fertilization trials installed in the southeast US have shown responses to nitrogen (N) and phosphorus (P) fertilization, resulting in a sustained increase in stand production at rotation age. Observed fertilization responses had been site-specific, therefore under budgetary constraints, the use of decision tools to appropriately select candidate responsive sites becomes a critical step in the decision framework. There are several models of response to fertilization aiming at productivity gains evaluation. One drawback of such response models stays in their high dependability on empirical relations showing weak biological soundness, constraining use outside the domain of the data used to calibrate them. Mainly, these models are not bounded, failing to limit response rates as fertilizer amount increases plus an incomplete acknowledgment of the uncertainty associated with the predicted process. To bridge this gap, we developed a response model that evaluates the relative response to fertilizer addition, including site index and relative spacing as model parameters as well as to explicitly account for response uncertainty. The new stochastic model is bounded in the magnitude of the response, also allowing practitioners to visualize the areas with the highest chance to increase forest value.

Assessment of the spatial variability in clonal eucalypt stands

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Better site-specific management is possible through spatially explicit site information. Conventionally, spatial information is generated through the interpolation of the inventory plots. The spatial information generates colorful maps, but are these maps useful for providing better site-specific management? The high uncertainty associated with the volume estimates (interpolated) does not ensure the information reliability. Consequently, the understanding of the factors that result in the high volume variation within a stand cannot be assessed. The advance of technology, however, appears as a chance to overcome this drawback. Thus, we propose the use of sensors in operations that are able to measure the volume of each harvested tree. A modeling approach (through kriging) combined to the highly detailed dataset furnishes spatially explicit volume information with great accuracy. The dataset are derived from a stand harvested in 2018. Data was recorded through sensors used in the harvesting operation. At the end, we offer a methodology that provides highly detailed spatial information with high degree of accuracy, while also enabling the assessment of the spatial variability within a stand.